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Voting System Standards, Testing and Certification

8/6/2018

Overview

Voting machines have an integral role in ensuring the integrity of elections, and thus of protecting democracy. It's important that voting machines are doing what they are designed to do: Record citizens' votes in a secure and accurate way. Voters must be confident their votes are being recorded as cast, that their privacy is being protected, and that the machine is tamper-proof. To provide this level of confidence, voting machines are tested against standards before being used in an election.

Those standards vary from state to state. Some states adopt federal standards, some develop their own standards and others use a hybrid of both approaches. See which states use federal standards and certification below.

What Voting Equipment Is Used Nationwide?

After the 2000 presidential election and the 2002 Help America Vote Act (HAVA) (https://www.eac.gov/assets/1/6/HAVA41.PDF), most election jurisdictions in the country replaced older mechanical lever voting machines and punch card voting systems with one of two kinds of systems: Direct Recording Electronic (DRE) voting machines or optical scan paper ballot systems. A few small jurisdictions hand count paper ballots as well.

DREs use a touchscreen, dial or push button to directly record votes into the computer memory. Some DREs contain a Voter Verified Paper Audit Trail (VVPAT) printer that allows voters to review their selections on a separate paper record before casting the ballot.

Optical scan machines count paper ballots either at the polling place—a precinct count—or at a central location—a central count. A voter fills in an oval, completes an arrow or fills in a box on a paper ballot, much like standardized tests. Paper ballots are then tabulated using the optical scanner.

What Do Voting System Standards Address?

Each state sets its specific standards for voting systems in statute and/or administrative rule. These can be based on the voluntary standards set by the EAC, or not. The most common issues that voting system standards are likely to address are: security, functionality, privacy, usability, and accessibility.

Security

A “secure” voting machine means one that cannot be tampered with or manipulated. Security begins with requiring that systems accurately record votes as cast. Although requirements vary from state to state, other aspects of security that may be addressed include:

Physical security of the equipment and ballots: Procedures that ensure that additional votes cannot be cast after the polls have closed or tampered with at any stage of the process, and that there is an auditable “chain of custody.”

Auditability: The capability of a machine to maintain an audit record that can be reviewed post-election.

Internet connection: Ensuring a machine cannot be connected to the Internet or networked during the voting period to avoid the potential for hacking.

Functionality

Standards may also address specific functionality that a voting machine should have. Functionality might include:

Correctly registering and recording all votes cast.

Permitting the voter to vote for any person, office or measure for which he or she has the right to vote.

Permitting a voter to review his or her votes before casting them, and providing the opportunity to change or correct the ballot before it is cast and counted.

Notifying a voter if he or she has cast too many votes for a particular candidate or issue (overvoted) or neglected to vote for a particular candidate or issue (undervoted).

Providing a method for voters to “write-in” a candidate of their choice.

Accumulating total ballots cast.

Privacy

Voters have a right to a secret ballot and to cast their vote in private. This is necessary to protect voters from being coerced or bribed into voting a certain way. In the context of a voting machine, this means that the system shouldn’t provide a receipt or any way for another person to determine the contents of a voter’s ballot.

Usability

Casting a ballot should be easy for voters. This means that a voting machine should be as intuitive to use as possible and contain clear instructions regarding how to vote. The way that the ballot is designed and presented—on-screen or on paper—is also important. Ballot design and usability is an integral part of voting system design.

Accessibility

By federal law, all people, including those with visual, physical or cognitive disabilities, must have the opportunity to independently cast their votes. Paper is not accessible for many people, either because of vision impairment or because pen and paper are hard to manipulate. As the population ages, the demand for adaptive systems with continue to grow. By federal law, voting systems must also have the ability to provide alternative language accessibility.

Who Sets Voting System Standards?

The U.S. Election Assistance Commission (EAC) (http://www.eac.gov/default.aspx) was established by the federal Help America Vote Act (HAVA) of 2002 and charged with developing Voluntary Voting System Guidelines (VVSG). (https://www.eac.gov/voting-equipment/voluntary-voting-system-guidelines/) These guidelines, which are voluntary for states, outline specifications against which voting systems can be tested. They address all the requirements listed below—security, functionality, privacy, usability and accessibility. The EAC relies on the National Institute of Standards and Technology (http://www.nist.gov/itl/vote/) (NIST) to write the detailed technical guidelines, and on the Technical Guidelines Development Committee (http://www.eac.gov/about_the_eac/technical_guidelines_development_committee.aspx) (TGDC), a group of volunteer stakeholders—vendors, academics, advocates, election officials, etc.—to review the guidelines. The TGDC makes recommendations to the EAC, which then formally adopts them.

The VVSG 1.1 were adopted on March 31, 2015. These are the most current federal guidelines to be formally adopted.

States that use federal standards to evaluate their voting systems typically do so using this set of standards. Before the EAC was created, the National Association of State Election Directors (NASED) certified voting systems according to standards developed by the Federal Election Commission (FEC). Some state statutes still refer to NASED and FEC standards and certification, although it has been more than a dozen years since they were active.

Testing and Certification of Voting Systems

Local jurisdictions select and purchase voting systems, but before they are able to do so the system must go through a testing process to ensure that it meets state standards and in some cases federal standards as well. Voting system vendors are responsible for ensuring that the system is tested—often through a federally accredited Voting Systems Test Laboratory or VSTL— (http://www.eac.gov/testing_and_certification/laboratory_accreditation.aspx)to the required standards. Once testing is complete, approval is issued at the state level and local jurisdictions may purchase the system.

Thirty-eight states and the District of Columbia use some aspect of the federal testing and certification program (http://www.eac.gov/testing_and_certification/default.aspx) in addition to state-specific testing and certification of systems:

- Nine states and D.C. require testing to federal standards (http://www.eac.gov/testing_and_certification/voluntary_voting_system_guidelines.aspx) (states reference standards drafted by the FEC, NIST or the EAC): Connecticut, D.C., Hawaii, Indiana, Kentucky, Nevada, NewYork, Tennessee, Texas and Virginia.
- Seventeen states require testing by a federally accredited laboratory: Alabama, Arkansas, Arizona, Colorado, Illinois, Iowa, Massachusetts, Maryland, Michigan, Minnesota, Missouri, New Mexico, Oregon, Pennsylvania, Rhode Island, Utah and Wisconsin.
- Twelve states require full federal certification (http://www.eac.gov/testing_and_certification/testing_and_certification_program.aspx) (in statute or rule): Delaware, Georgia, Idaho, Louisiana, North Carolina, North Dakota, Ohio, South Carolina, South Dakota, Washington, West Virginia and Wyoming.

Four states refer to federal agencies or standards, but do not fall into the categories above:

- Alaska: the director may consider whether the FEC has certified a voting machine when considering whether the system shall be approved for use in the state (though FEC certification is not a requirement).

  California: the Secretary of State adopts testing standards that meet or exceed the federal voluntary standards set by the EAC.

- Kansas: requires compliance with voting system standards required by HAVA.
- Mississippi: DREs shall comply with the error rate standards established by the FEC (though other standards are not mentioned). (Note that the FEC no longer sets voting system standards.)

Eight states have no federal testing or certification requirements. Statutes and/or regulations make no mention of any federal agency, certification program, laboratory, or standard; instead these states have state-specific processes to test and approve equipment (Note that even states that do not require federal certification typically still rely on the federal program to some extent, and use voting systems created by vendors that have been federally certified):

- Florida, Maine, Montana, Nebraska, New Hampshire, New Jersey, Oklahoma, and Vermont.
- American Samoa, Guam, Puerto Rico and the Virgin Islands are also in this category.

University Partnerships

Some states partner with universities to conduct certification and testing of voting equipment. Connecticut law (Conn. Gen. Stat. Ann. §9-241(b)) allows the Secretary of State's office to enter into an agreement with a state university to assist with technical reviews, testing and research on certification or decertification of voting equipment, and the development of standards to protect the integrity of voting equipment. The Connecticut secretary of state partners with the University of Connecticut's Center for Voting Technology Research (http://voter.engr.uconn.edu/voter/) to perform these functions. In Indiana, Ball State University's Voting System Technical Oversight Program (VSTOP) (http://bowencenterforpublicaffairs.org/institutes/policy-research/election-admin/vstop) advises the secretary of state on the certification of voting systems in Indiana (Ind. Code §3-11-16-4).

Additional Resources

- Articles from NCSL's elections newsletter, *The Canvass*:
  Voting Tech Standards—What Legislators Need to Know (/default.aspx?tabid=25541)
  Voting Technology—Current and Future Choices (/default.aspx?tabid=24828)
- The EAC's Voluntary Voting System Guidelines (http://www.eac.gov/testing_and_certification/voluntary_voting_system_guidelines.aspx)
- The EAC's Testing and Certification Program (http://www.eac.gov/testing_and_certification/default.aspx)
- The University of Connecticut's Center for Voting Technology Research (http://voter.engr.uconn.edu/voter/)
- Ball State University's Voting System Technical Oversight Program (VSTOP) (http://bowencenterforpublicaffairs.org/institutes/policy-research/election-admin/vstop)
- The EAC'S report on State Requirements and the Federal Voting System Testing and Certification Program (http://www.eac.gov/assets/1/Page/State%20Requirements%20and%20the%20Federal%20Voting%20System%20Testing%20and%20Certification%20Program.pdf) (2009)
- Verified Voting's report Changes Ahead: A Look At Voting System Testing and Certification (https://www.verifiedvoting.org/wp-content/uploads/2013/07/ChangesAhead-ALookAtVotingSystemTestingCertification.pdf)
- Links to documents from the Annual State Voting Systems Testing Conference (http://bowencenterforpublicaffairs.org/institutes/policy-research/election-admin/conference)
- The USENEX Journal of Election Technology and Systems (https://www.usenix.org/jets)

Contact NCSL's elections staff (mailto:elections-info@ncsl.org?subject=%5BREG%5D) at 303-364-7700 for more background materials.

(https://www.ncsl.org/meetings-training/state-policy-101-sessions.aspx)

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Members Resources

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- (https://www.ncsl.org/meetings-training/state-policy-101-sessions.aspx)Get Involved With NCSL (/legislators-staff.aspx)
- Jobs Clearinghouse (/legislators-staff/legislative-staff/jobs-clearinghouse-service.aspx)
- Legislative Careers (/legislators-staff/legislative-staff/legislative-staff-coordinating-committee/legislative-careers.aspx)
- NCSL Staff Directories (/aboutus/ncslservice/ncsl-staff-directories-and-online-requests.aspx)
- Staff Directories (/aboutus/ncslservice/staff-directory-search-form.aspx)
- Terms and Conditions (/aboutus/ncslservice/ncsl-website-terms-and-conditions.aspx)

Policy & Research Resources

- Bill Information Service (/aboutus/ncslservice/bill-information-services-overview.aspx)
- Legislative Websites (/aboutus/ncslservice/state-legislative-websites-directory.aspx)
- NCSL Bookstore (/bookstore.aspx)
- State Legislatures Magazine (/bookstore/state-legislatures-magazine.aspx)

Accessibility Support

- Tel: 1-800-659-2656 or 711 (tel:18006592656)
- Accessibility Support (/aboutus/ncslservice/ncsl-accessibility-help.aspx)
- Accessibility Policy (/aboutus/ncslservice/ncsl-accessibility-policy.aspx)

Meeting Resources

- Calendar (/meetings-training/ncsl-meetings-calendar.aspx)
- Online Registration (https://www.ncslcommunities.org/engage/s/events)

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